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"I like everything about it" – Perceived educational value of a digital gaming experience with Assassin's Creed Odyssey: Discovery Tour

"I like everything about it" - Valore educativo percepito di un'esperienza gaming digitale con Assassin's Creed Odyssey: Discovery Tour

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ABSTRACT While research on videogames in education mostly focuses on demonstrating the effectiveness of Game Based Learning in a broad range of educational contexts, few studies have focused on examining in-depth stakeholders' perceptions in the educational/teaching area concerning gaming experiences based on a first-person play session. To fill this gap, this study presents the results of a reflexive thematic analysis of the answers to a qualitative survey based on a gaming experience of 13 informants related to the educational field (teachers, researchers, and Master degree students). The game used in the experience was *Assassin's Creed Odyssey: Discovery Tour*. The main aim was to understand their perceptions of possible uses of this digital game in formal educational contexts. Our analysis reveals the general perception of a significant overall advantage in the use of this game as an instructional tool compared to a traditional pedagogical approach. Pedagogical solutions for an instructional implementation and design, teaching interventions, critical perspectives are discussed.

KEYWORDS Game-Based Learning (GBL); Videogames; Qualitative Survey; Thematic Analysis; Instructional Design.

SOMMARIO Mentre la ricerca sui videogiochi in educazione continua a concentrarsi nel dimostrare l'efficacia dell'apprendimento basato sui giochi in un'ampia varietà di contesti educativi, pochi studi si sono concentrati nell'esaminare in profondità le percezioni degli *stakeholder* in ambito educativo/didattico a seguito di esperienze di gioco in prima persona. Per far fronte a questa mancanza, questo studio presenta i risultati di un'analisi tematica riflessiva in relazione a un'indagine qualitativa basata su un'esperienza di gioco di 13 soggetti operanti in ambito educativo (insegnati, ricercatori e studenti di laurea magistrale). Il videogioco usato nell'esperienza è stato *Assassin's Creed Odyssey: Discovery Tour*. Il principale obiettivo era comprendere le loro percezioni per un possibile utilizzo di questo gioco digitale in contesti educativi formali. La nostra analisi rivela la percezione generale di un complessivo significativo vantaggio nell'utilizzo di questo titolo videoludico come strumento per l'apprendimento rispetto ad un approccio pedagogico tradizionale. Soluzioni pedagogiche per la progettazione e l'uso didattico, interventi didattici e prospettive critiche vengono discussi.

PAROLE CHIAVE Game-Based Learning; Videogiochi; Indagine Qualitativa; Analisi Tematica; Progettazione Didattica.

1. Introduction

Pedagogical videogames potentialities have attracted increasing attention over time in scientific literature. As a consequence of this pedagogical attention to videogames, Game-Based Learning (GBL) has seen a growing interest, to the point that it is a popular and topical field (Karagöz & Ateş, 2022). In support of this growing pedagogical relevance, GBL is even mentioned in the *Guidelines for teachers and educators on tackling disinformation and promoting digital literacy through education and training* of the European Commission (EC, 2022) as a strategy that (if well designed) can improve learning outcomes. Going beyond the entertainment potential of games, GBL sees them as instructional tools to improve learning outcomes (Fioretti, 2023, p. 9). Since its early argumentative disclosures (Prensky, 2001; 2003), GBL has been refined to become a well-established strategy. Nowadays, an increasing number of works on game-based learning are focusing on showing its effectiveness in a wide range of educational contexts and for different educational purposes. Research on GBL and education is predominantly based on a quantitative or experimental approach (Costa et al., 2016, Erşen & Ergül, 2022; Guerra-Antequera & Revuelta-Domínguez, 2022) frequently aimed at proving the effectiveness of GBL in education (see, e.g., Erşen & Ergül, 2022). Yet the literature still lacks qualitative studies investigating in depth the perceptions/perspectives of stakeholders in educational research and teaching practice about digital gaming. This is especially true concerning their pedagogical perspective about teaching strategies and implementing ideas/solutions and feedback for the pedagogical use of digital games as instruments. As pointed out by Andreoletti and Tinterri (2023), research on games has failed to examine the pedagogical perspectives of teachers "such as for instance design solutions or instructional strategies that the teacher adopts while teaching with the game[1]" (p. 15). Furthermore, according to many researchers (Andreoletti & Tinterri, 2023; Hanghøj & Brund, 2011; Kangas et al., 2016) the implementation of digital games in instructional design/teaching process is an under-investigated field. Thus, despite some recent studies focusing on instructional design in relation to the use of games (Andreoletti & Tinterri, 2023; Nesti, 2017; 2023; Sardo & Thibault, 2024; Ugolini & Morreale, 2023) there is still lot of work to do, especially within the digital game-based learning field.

From many viewpoints, it is important to consider the perspectives of teachers and educational researchers (and MA students) regarding first-hand gaming experiences with the aim of reflecting on the educational use of digital games. On the one hand, we know that teachers/educators play a substantial role in game-based activities (Kangas et al., 2016); considerations stemming from a gameplay experience of these subjects can provide fruitful insights for an *ex-ante* instructional design of game-based interventions, as well as for a greater establishment of a game-based pedagogy. On the other hand, these perspectives can indirectly provide useful insights for game designers oriented towards integrating, modifying or refining pedagogical principles and processes.

In order to examine these perspectives, we conducted a qualitative survey on a gaming experience we set up for a precise "educational[2]" case study: the *Discovery Tour* of *Assassin's Creed Odyssey*, a dedicated stand-alone videogame linked to the famous game series *Assassin's Creed Odyssey*. The object of this game was designed primarily for educational and (in)formative purposes and for entertainment and it is based on the fruition/discovery of educational contents related to the history/culture of Ancient Greece.

[1] Translated into English by the authors from the original Italian.

[2] For the purpose of this research, we consider this game as an educational game, by virtue of its contents, even though it is actually an "educational" version of a Triple A commercial digital game environment.

In this study we underline the importance of investigating these perspectives before planning game-based interventions.

Against this backdrop, our main Research Objectives (ROs) are:

- *RO1*. Understanding the perceptions, instructional solutions/ideas and instructional feedback of qualified informants (including MA students) concerning a gaming experience based on *Assassin's Creed Odyssey: Discovery Tour* with regard to the possible use of this digital game in formal educational contexts for educational purposes.
- *RO2*. Understanding their critical perspectives about the digital "educational" game as an educational tool.

In order to analyze the survey data, we conducted a systematic reflexive thematic analysis. It should be noted that this research represents a first step towards a wider goal: these qualitative findings will in fact be propaedeutic for the creation of an instructional game-based design (containing, among various games, the adoption of this educational videogame) for formal education contexts.

2. Background

Over the course of time the educational potential of videogames has been extensively explored. Some researchers argued in favour of their educational use - mostly addressing the general public - and began to dismantle the prejudices surrounding them (Prensky, 2001; 2003; 2006). Others looked semantically at (some) videogames as "pedagogical treasure-chests" containing effective educational principles and as learning machines (Gee, 2005; 2013). They thus considered videogames to be what an effective learning system should be (see Rivoltella, 2007, p. VIII), a system reflecting learning principles, and an inspiration for rethinking instruction (see Nesti, 2017, p. 47). Others have illustrated the potential of these media tools, pointing out the social and active dimensions of gamers and shedding light on the pedagogical challenges of adopting videogames in the classroom (Persico et al., 2019; Shaffer et al., 2005; Squire 2005) and the opportunities (Squire, 2003). Still others focused on examining the different formative benefits of videogames (De Castro et al., 2018; Grande-de-Prado, 2018; Merino Campos & del Castillo Fernández, 2016; Griffiths, 2002). Lastly, there was obviously no lack of concerns in the educational field (see, e.g., Provenzo, 1991). In this panorama, the Assassin's Creed videogame series has been explored in academic debate within a variety of fields: some authors reflected on simulation and the meaning of representation of environments, architectures and monuments of specific videogames (Aroni, 2022; Dow, 2013); others investigated the role of these games in transmedia/interactive storytelling (Menon, 2015; Veugen, 2016); others discussed narrative, gameplay and authenticity (Politopoulos et al., 2019) and still others specifically examined the *discovery tours* game titles (Paananen et al., 2023; Poiron, 2021; Sardo & Thibault, 2024).

In this study we set a gaming experience based on the *Discovery Tour* of *Assassin's Creed Odyssey* (also known as *Discovery Tour: Ancient Greece*[3]). This is a dedicated (stand-alone) game introduced in 2019 and set in Classical Greece. Through this game, the player can discover virtual representations of historical places and monuments and learn about cultural-historical topics related to ancient Hellenic culture. The educational material of the game takes the shape of a tour (like a virtual living museum)[4]. The game allows the player to navigate its space, a vast open-world virtually reproduc-

[3] https://www.ubisoft.com/en-us/game/assassins-creed/discovery-tour

[4] For an overview of the tour Cf. Ubisoft AC UK at https://www.youtube.com/watch?v=jZpRAxH-AHs

ing Classical Greece, to interact with the environment and to choose, undertake and discover different tours divided according to different themes (namely: *Daily Life*; *Politics and Philosophy*; *Art, Religion, and Myths*; *Battles and Wars*; *Famous Cities*). Each tour is articulated in different "stations" (points of interest such as places/monuments) and features a narrative voice that explains the history, the details and the information related to them. The tour-path is also full of informative captions often displaying real images of places/monuments/artifacts, whereby it is easy to compare virtual representation and reality. At the end of each tour (30 in total) a multiple-choice quiz is available, aiming at testing knowledge of the information provided during the tour. The game also enables the player to talk/interact with fictional or historical characters (such as Leonidas, Herodotus, Aspasia) who introduce/guide the tour. Finally, although the game is predominantly based on experiencing tours (which follow a linear path), players can choose how to explore its environment and undertake tours: (through the game map, just by walking, selecting the tours according to different themes in the menu, or following a chronological approach from a timeline menu). In contrast to the main title (*Assassin's Creed Odyssey*) this "educational" title does not feature any violent content (such as blood, death, killings, etc.).

In a previous exploratory study (Sardo & Thibault, 2024) we examined this digital educational environment from a space-centred educational perspective. Our work revealed that the space of this digital game title seems to incentivize a mainly transmissive-receptive instructional architecture, and to a lesser extent, an exploratory instructional architecture (see architectures of Instruction in Bonaiuti, 2014; Bonaiuti et al., 2016; Clark, 2000). Furthermore, we have explained how the synergy of various elements in the ludic relation with space[5] invites/increases specific forms of playful action and, at the same time, incentivizes different learning strategies.

In this study, we intend to expand our previous exploratory study, by conducting an empiric gaming activity based on making a specific target (see par. 3.1.) play/experience this game, in in order to elicit their opinions to inform future pedagogical research.

3. Methodology and materials

The research design of this case-study, which is part of a larger research project, is mainly that of *interpretative research* (Trinchero, 2002, pp. 60-66) and is qualitative-empiric in nature.

3.1. Survey context

The survey was conducted during the month of March 2024 at Tampere University. The gaming activity we designed was meant to be carried out individually and restricted to people over 18 years of age. Recruitment channels were: *slack*, e-mails, posters scattered around the university, and postings on the university portal. Participants were asked to select an available 90-minute slot on a calendar, via *Doodle* platform, and to show up for the selected time and day at the laboratory. Participation in the activity was on a voluntary basis and participants were allowed to withdraw at any time. As a sign of appreciation for participating in the activity, participants were offered a 20€ gift-card.

Participants were selected according to precise criteria. The main underlying assumption behind the selection was that the participants should belong to the educational sector. In particular, they were expected:

[5] Namely: linearity of tour spaces; limited interaction with the environment; unbalanced space layout; parkour mechanics, exploratory mechanics, urban furniture and photorealism.

Figure 1. Study set-up: gaming cubicle.

- to be teachers or have teaching experience in the school sector (especially in the field of history) or in higher education.
- to be scholars (including MA students) in the pedagogical/educational field or researchers in the field of history[6] or history education.

The degree of gaming skill (*game literacy*) was not considered, as the game is very intuitive and accessible in terms of controls and, therefore, game literacy did not impact on final results. Moreover, various controls, basic commands, and mechanics for playing the game were explained in detail during/before the laboratory activity.

3.2. Study setting, set-up and equipment

The gaming activity took place in the technology laboratory *Ludus Lab* of Tampere University, designed for controlled experiments and equipment with gaming hardware and quiet spaces. Once at the laboratory, each participant was welcomed, the information sheet and the informed consent form were shown and the activity was explained. After filling out and signing the informed consent form, we had the participant enter in a gaming cubicle (Figure 1), wherein the gameplay session and the compilation of the related survey questionnaire took place. The equipment used by the participant inside this gaming cubicle consisted of:

- High-performance PC – connected to a 4K monitor – within which the game was installed.
- Headphones, worn by the participant to hear the audio of the game.

[6] We refer here to participants such as University professors, researchers and PhD students who, given their academic role, presumably had teaching experience. Therefore, the fact that we also looked at academic participants related to the field of History is, in any case, subordinate to educational purposes: as the game title is mainly related to the fruition of historical (and related) content, therefore the perceptions of those engaged in historical research is, indirectly, also beneficial from an educational standpoint.

– Keyboard and a mouse used by the participant as controls to play the game and for the completion of the questionnaire after the gameplay session.

In addition to the gaming cubicle instrumentation, two instruments were used by the researcher(s): a laptop, to remotely monitor the participant and another PC monitor to observe his/her gameplay, both located in another space within the laboratory.

The activity consisted of three phases:

1) *Introductory gaming phase*: During the first phase, participants were asked to explore the introductory tour (tutorial) of the game for 15 minutes, in order to familiarize themselves with the game and its controls. Before starting this phase, the basic commands for playing the game were explained.
2) *Free gaming phase*: After the tutorial phase, participants were asked to play the game in total freedom according to their own approach/preferences (selecting tours of interest, deciding how to explore the environment, where to go, what to do, etc.) for 35 minutes. Before starting this phase, various mechanics and gameplay/exploration possibilities of the game world were explained in more detail.
3) *Survey questionnaire completion*: Subsequently, still within the gaming cubicle, participants were asked to fill in an online questionnaire (survey) for the remaining time (approximately 30/40 minutes). The questionnaire was completed anonymously (no log-in required).

Thus, phases 1 and 2 concern the gameplay session (50 minutes of gameplay activity in total) and phase 3 consists of filling out the survey questionnaire about the gaming activity just experienced for the remaining time.

The only recording made during the activity was the PC game screen during gameplay session (phases 1 and 2) via a screen recording software installed in the high-performance PC used by the participant, and this recording was started and stopped in their presence inside the gaming cubicle. Before starting the activity, and the gameplay screen recording, the participant was informed that we would also remotely observe their screen during the gameplay session (phases 1 and 2).

Furthermore, still during the gameplay phases, the players inside the cubicle were also monitored remotely by a video camera placed above the gaming computer (the high-performance PC), and we also remotely observed their screen during play. The video camera was connected to another PC (laptop) located in another space in laboratory, separate from the gaming cubicle. The camera was not used to record but only to monitor the participant in case assistance was required. Before starting the gaming activity, the participant was in fact asked to raise his or her hand if in need of help or technical support.

In conclusion, the overall duration of the laboratory activity was, approximately, 1 hour and 25 minutes.

3.3. Survey questionnaire

Since our goal is an in-depth understanding of a given phenomenon (figuring out opinions/perspectives of subjects involved in the educational/teaching sector regarding the gaming experience from an educational perspective), we adopted a self-compiled questionnaire with open-ended questions as a data collection instrument (Trinchero, 2002). This choice is particularly useful if "[...] *the researcher's objective is to come to the understanding of a phenomenon, rather than to the explanation of a factor on the basis of others*"[7] (Trinchero, 2002, p. 199). This consists of two main sections:

[7] Authors' English translation from the original Italian text

1. Outline a short list of positive aspects that you have noticed about this digital game, if any. (You can separate aspects with a comma, e.g.: graphics, playability, educational contents, etc. In case you did not notice any, write 'none').

2. Outline a short list of negative aspects that you have noticed about this digital game, if any. (You can separate aspects with a comma, e.g.: graphics, playability, lack of interaction, etc. In case you did not notice any, write 'none').

3. What are your thoughts regarding the pedagogical dimension of this digital game? (If you can, please articulate your answer)

4. Where there any features that impressed you about this digital game? If yes, which ones?
(If you can, please articulate your answer)

5. Do you think this digital game could be integrated into formal educational contexts for educational purposes? If yes, in what ways (teaching strategies, educational methods, ideas, etc.)?
(If you can, please articulate your answer)

6. Do you think there are possible advantages in integrating this digital game as part of educational activity in formal educational contexts? If yes, which ones?
(If you can, please articulate your answer)

7. Do you think there are any possible risks in integrating this digital game as part of educational activity in formal educational contexts? If yes, which ones?
(If you can, please articulate your answer)

8. Would you personally use this digital game in formal educational contexts for educational purposes?
(If you can, please explain the reasons for your answer)

9. Please feel free to add here any other information you think is useful about this digital game or this experience:

Figure 2. Open-ended questions (original English text).

– The first is related to demographic data (gender, age-group, etc.) and background especially in relation to the selection criteria, such as level of education, teaching experience, experience with educational games, experience with the present case study, etc.
– The second part is the core of the survey and consists of nine open-ended questions (the last one does not require a mandatory answer) aimed at sounding out participants' opinions/perspectives/perceptions, with regard to the gaming experience in the laboratory, concerning educational issues (such as thoughts about the pedagogical dimension of the title, possible integration and adoption within formal educational contexts, etc.). For the sake of transparency, we report here the questions that were asked (Figure 2):

The questionnaire was administered after the gameplay session (see survey questionnaire completion in par. 3.2). *Microsoft Forms*, connected to the university's institutional account, was used to create the questionnaire.

3.4. Participants

3.4.1. Participants' Background

The subjects (n=13) who participated in the gaming activity in the laboratory, while mostly working/studying/doing research in Finland, were sufficiently diverse in terms of age group (3 aged 21-29, 6

aged 30-39, and 4 aged 40-49), gender (7 female, 4 male, 2 non-binary) and study level/occupation (7 researchers ranging from PhD student status to professor status, 4 MA students, 1 lecturer and 1 subject with a long experience in school teaching).The vast majority of the researchers (all but one) reported that their research is specifically in the field of educational sciences (pedagogy, didactics, learning, etc.). All the participants are related to the teaching practice (teaching or have teaching experience) in higher education, schools, or in both.

3.4.2. Experience with video games

Concerning the experience with video games, in a 5-point Likert scale:

- 5 participants reported they play video games *rarely (only a few times a year)*;
- 4 very frequently *(several times a week);*
- 2 occasionally *(a few times a month);*
- 1 frequently *(several times a month);*
- 1 does not play.

Among the participants who are players, Figure 3 details the type of platform on which they usually play video games.

With regard to the experience with video games made for educational purposes and with our case study:

- Almost all the participants (all except three) reported having played video games made for educational purposes before.
- The vast majority of participants (all except four) reported that they have heard of the *Assassin's Creed* game series before.
- Almost all the participants reported that they have never played one or more video games from the *Assassin's Creed* series before.

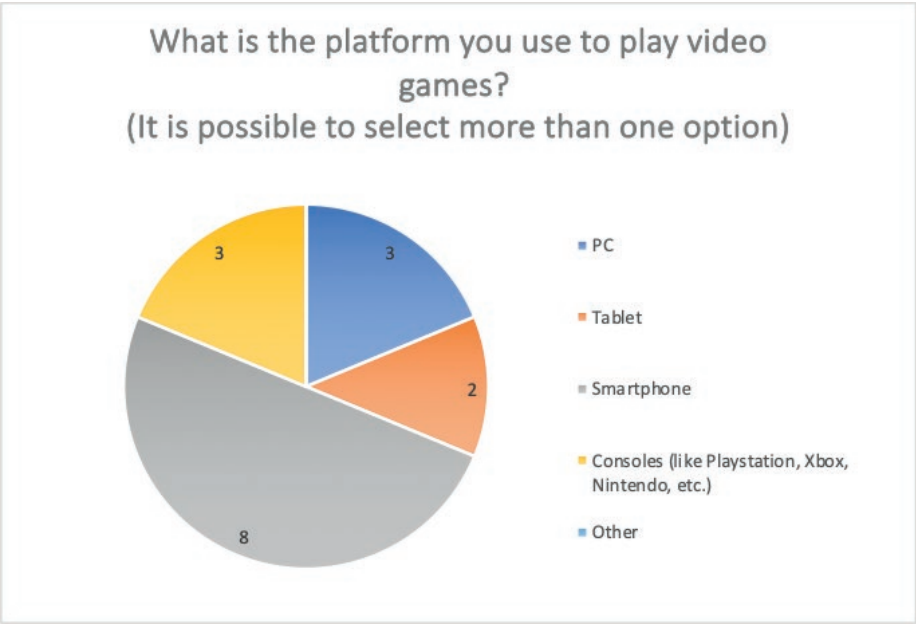

Figure 3. Platform used by the participants to play video games.

– All the participants, except one, reported that they had never before played the game we asked them to play in the gaming activity (*Discovery tour* of *Assassin's Creed Odyssey*).
– All the participants, except two that selected the answer "*more yes than no*", reported they are, in general, in favour of using video games as educational tools.

3.5. Data analysis

To analyse the survey data, we conducted a reflexive thematic analysis (Braun & Clarke, 2006; Braun & Clarke, 2012, Braun & Clarke, 2019; Pagani, 2020). Thematic analysis "is a method for systematically identifying, organising, and offering insight into, patterns of meaning (themes) across a dataset" (Braun & Clarke, 2012, p. 57). It represents a methodological approach that valorises the role of the researcher in the production of knowledge and, consequently, consider the perspective of the researcher as a resource, rather than a limitation (see Braun & Clarke, 2019).

The underlying reason for choosing this method (instead of other qualitative methods) is ascribable to several factors. Firstly, the nature of thematic analysis fits in with the objectives of our research. Through an analytic and systematic procedure, it is possible to "dive" into the data (and especially to examine the dataset cross-sectionally) for an in-depth and holistic analysis, in order to have a more detailed report of the information within the data-set than is possible with a simple content analysis. Secondly, the reflexive thematic analysis is flexible both in terms of the underlying ontological/epistemological framework (see Braun & Clarke, 2019; Pagani, 2020) and in terms of the type of data and sample. It therefore struck us as the most suitable method, given both the multidisciplinary context of approaches/theories regarding gameful strategies (and *Game Studies*), and the textual data related to our sample, since it "[...] can be used for analyzing data derived from *vis-à-vis* 'traditional' methods such as interviews and focus groups; but also textual data gathered through qualitative surveys, diaries, the use of cartoons or story completion activities (*story completion tasks*), online discussion forums and other media sources [...]"[8] (Pagani, 2020, p. 63).

Therefore, according to Braun and Clarke's guidelines (2006; 2012; 2019) on *six-phases* of thematic analysis we proceeded as follows:

1) Before starting coding, we *familiarized* ourselves with the data by repeatedly and attentively reading the text extracts of the entire data-set from the questionnaire, trying to interpret the eventual typing errors due to writing on a PC keyboard.
2) After the familiarization phase, a two-way *coding process9* was carried out. To strengthen the reliability of research, this was done through two researchers who coded independently. We then compared the codes, identifying connections and signs of originality in each one of the codings. After mutual agreement, a single code list was drawn up. Both semantic and latent codes were generated.
3) The initial temporary themes were then *generated* by grouping the interconnected codes. Based on similarities, themes such as "Positive appraisal of pedagogical potential", "Suitable for instructional design", "Attention to perspective: historical accuracy, realism and representation", etc., were generated.

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[8] Authors' English translation of the original Italian text.
[9] Although we are aware that it is not explicitly required in reflexive thematic analysis (see Pagani, 2020, p. 58), we believe that coding through two independent coders can be an additional enriching process: in comparing researchers' views, confirming and thus reinforcing the subjective perspectives of individual researchers – and rendering the interpretations more sound – as well as in enriching the description of data (reaching analytical observations that one or the other researcher had not attained) and providing a more nuanced and complex picture of the information within the data-set.

4) We then moved on to the *theme review* phase. We tried to make sure that our themes were not "false themes", i.e., domain summaries/topics touched upon in the study (see Braun & Clarke, 2019). This led to an iterative path backwards (to the data) and a reformulation/modification of existing themes into new themes/sub-themes, in order for them to have internal coherence and specificity as well as to be distinct and defined.
5) Again after mutual agreement, we "refined" and gave a definitive name to the themes.
6) We finally wrote the report both in an *interpretative* and *analytic* way (see Braun & Clarke, 2006; 2019; Pagani, 2020, pp. 80-85).

The approach to thematic analysis was, overall, mainly *data-driven*.

4. Results

As a result of the thematic analysis, 3 themes were generated: *Game as instructional resource, Transmissive educational mode* and *Perspective*. The first two themes respond to the first research objective (RO1). The last one responds to the second one (RO2). All the themes are articulated in several sub-themes.

4.1. Theme 1. Game as instructional resource

4.1.1. Pedagogical relevance

In general, participants claim that the game has great pedagogical potential. Participants reported good potential for learning History and other subjects[10]:

> *"This is a powerful resource for learning History, culture, physics, and also to create an environment to discuss with student several topics like ethics, women rights, etc." (A)*
> *"This game is clearly quite potential for (various kind of) history for sure. But there might be potential for geography and physics for example too. Philosophy also and theology. But of course game should be adapted for the time period and or subject." (D)*
> *"It is a very easy way to get to know the history by playing the game." (L)*

In responding favourably for the adoption of the game in formal educational contexts for educational purposes, some reported that it should be made available for art and history related subjects (I). Others, answering about personal use of the game title in formal educational contexts for educational purposes reported: "*Definitely,* if I'd be *a history teacher who needs to cover Classical Greece in my classes. Or maybe even a PE teacher who wants to educate students about Olympics :)*" (E)

Other participants highlighted how the use of this game in higher education would allow for "interesting" learning experiences (F). Also responding favourably for an educational use for Geography and History, some elaborated considerations broadly extended towards virtual reality: "*Many other subjects could be taught too in immersive VR worlds (not necessary* [sic] *realistic).*" (G). Potential for magnetizing attention from inattentive students is also pointed out: "*I think it is a very good pedagogical tool especially for those students who can be inattentive.*" (I). Several participants (J, M) pointed out that the game would be a good tool for teaching history, some adding that it could be integrated in formal education

[10] N.B.,: English was not the mother tongue of respondents. Hence, any mistakes in the reported quotes have been left as they were in the original survey responses.

(M). Finally, some intrinsic educational characteristics specifically related to the game environment are mentioned "[...] *even if not taking the tours, the environment in itself educates the player about the daily lives of people, e.g. how they dress, how they act in public and interact with each other.*" (E), "*presence of ancient people (it was good to observe their dresses, conversations).*" (K), "*Allowing people to navigate through time in map is good.*" (M) and that "[...] *Its easy to remember the places in the map.*" (M)

4.1.2. Use in formal education

In general, almost all the participants believe that the game can be integrated into formal educational contexts for educational purposes (see question 5, Figure 2), and, in this regard, the majority reported that they would personally use it (see question 8, Figure 2). A set of elements certainly seems to contribute to this result; among these, we primarily have to mention: easy and accessible playability, presence (and richness) of several educational contents, graphics, immersive and detailed environment. As regards educational content and playability: "*educational content* [...] *diverse set of topics*" (E), "*easily accessible playability*" (H), "*graphics, playability, music, accuracy of storyline, ability to manipulate amount of exploration and amount of video material*" (I), "*educational contents (if you want to explore more you can additionally read)*" (K), "*knowability, playability*" (D), "*sections, game order, simple to play*" (L) are all appreciated elements (the last one striking). In particular, it is reported that "[...] *how content is split into tours is a good strategy to frame scope and give freedom to explore*" (A) and that learning with visual aids is in line/fits with formal education "[...] *because using visual aids is very much required in formal education gamification adds a lot to the mode of learning*" (B), "*helpful for learning with visuals*" (J), "*Children especially learn more through visuals and game is the most interesting thing for them.*" (J) and enthusiastically "*I like everything about it. it seems it was created with so much thought and effort.*" (J)

4.1.3. Use beyond formal education

Although the majority of participants would use this digital game personally (see question 8, Figure 2) in formal educational contexts for educational purposes, there was no lack of critical perspective. Some informants affirmed: "*I have a hard time seeing the game being used in the context of school-based education, and if so only with a huge amount of accompanying material, which might make workload and expected outcome not meet each other.*" (H) and that "[...] *I would define the pedagogical dimension of it as a tool, which can only be applied in combination with a variety of othe rtools* [sic]". (H). Therefore, as concerns personal use "*Theoretically yes, within the context of education within museums. Practically, this would potentially require software modifications, which make it hard to realize.*" (H). Then, suggesting an adoption of the game only in combination with concrete objects or with a variety of other tools. Nonetheless, the participant reported that "*I could see the game being used in museum education though, especially when splitted into slices and put into dialogue with historical artifacts in exhibitions (e.g. putting the historical colourful reliefs and statues within the game in dialogue with the weathered and therefore colourless statues in exhibition spaces; or to provide context for exhibited tools oder* [sic] *objects of general life*)" (H). Then someone who, while still unsure about formal education contexts, would like to use it for a personal usage: "*I am not sure about formal educational context, but I would like to use it game for my son to show him the ancient world in the addition to e.g., books, movies*" (K). Finally, one participant agrees both with personal and formal educational use: "*Yes I will Not only for*

my formal education even for my personal Interest of Travelling I will have this tour and then, I will be visiting the place which i wanna go" (B)

4.1.4. Implementation

The importance of the variety of educational topics (contents) is then endorsed on the grounds that this could even provide insights for structuring/planning lessons; indeed, the game "[...] *can get the ideas for teachers how the lessons can be structured (based on locations or based on topics)*" (K), "*If integrated, it could help teachers to convey certain topics to students more easily.*" (E). There is also one who suggests an individual or group use: "*Teachers can integrate into their lesson, either as a tool to be used by students individually or for the class to explore together.*" (I). Still others, as a first starting approach to the ancient Greek culture: "*yes, I would suggest to use it for getting familiar with the antient Greek atmosphere. It can give the first impression. it can catch initial interest and motivation to that topic.*" (K).

4.1.5. Game-based Education vs. "Traditional" Education

Several comparisons between the use/integration of the present game title in educational environments and "traditional" education were made. Firstly, it would seem that the integration of the game in the educational field could be beneficial for a wider comprehension of educational topics, as well as more engagement, motivation, interest and even learning of students. In answering to the formal educational integration of the game, some reported:

"*For sure ,* […] *can be it need to be Integrated to have a better and Quick experience of history*" (B)
"*Sure! It is more engaging than a slides or handouts.*" (C)
"*Yes, I think it brings great depth to 'traditional' pedagogical contents, such as reading a book or filling out paper sheets.*" (E)

Participants also stated that the game was more motivating than a book or video (G), more fun than ordinary teaching (E, J), that it could enhance student learning (L), motivation and engagement (I), interest in learning contents (F) and that they will study more History (F). However, some noted that these benefits could be contextual:

"*As an optional and additional offering to students, it might be possible to increase engagement. Still, depending on experience with the Assasins Creed* [sic]*, or gaming in general, not every student might be motivated to pick up this game* […]". (H)

Furthermore, beyond the use "*as motivational tool for students*" (K), even benefits for disadvantaged students with "canonical" methods and advantages in attracting students for less interesting contents were reported: "*it increases accessibility for learners who might be disadvantaged when learning through conventional methods.*" (I), "*a very good way to attract students for less interesting contents*" (F). Further interesting pedagogical considerations about learning by playing were also made: "*learning enhance if it is according to the interest of children. Children not only will take it as a game but will learn also at the same time.*" (J), "[...] *it helps students to learn details in a fun way.*" (L). Answering about possible risks on integrating the game in formal educational contexts for educational purposes: "*I do not think there is any risk. Children now a days palsy* [sic] *games every day. Why not for learning?*" (J). Lastly, in addition to this number of positive benefits, there were even truly enthusiastic pedagogical affirmations:

"*As a teacher of history, I must say that it is the best way to teach history to the students of all levels.*" (J)

Furthermore, there are hopes for a future formal game-based education: "*I hope learning through gamers woulod* [sic] *become part of formal education soon.*" (J). In conclusion, based on the experience of participants, it seems that there would be a significant overall advantage in using this game as a GBL tool compared to classic educational methods, in terms of motivation, interest, engagement, and for less interesting contents, and even in increasing accessibility for disadvantaged students with conventional methods.

4.2. Theme 2. Transmissive educational mode

4.2.1. Transmissive-Receptive architecture

Among the characterizing factors of instructional receptive architecture there are: control by instructional source, information prestructuring, scarce or absent interaction and a certain linearity in the information transmission process (Bonaiuti 2014, Bonaiuti et al., 2016; Clark, 2000). These elements have characterized instruction modalities for a long time (the old well-established and still most commonly used *lectio* comes to mind), presuming a passive role of the learner (the jar to be filled). The game seems to follow mainly this type of instructional model and this is proven by participants' experience; they reported:

"[…] *i was just going from point to point and listening lectures* […]" (D)
"*Walking from spot to spot is not very engaging, you cannot interact with any of the topics shown* […]" (C)
"*no surprise (the same steps for each tour)*" (K)
"*The tours did not engage me, there was a lack of interactivity. I wanted to engage with more characters, and join them in doing their everyday life.*" (C)

Others comments underline this lack of interaction (G, H), others that information is shown in boring ways (C), and that the learning part can be a bit dull for a young audience (G).

4.2.2. Learning assessment: quizzes

A type of learning historically linked to this instructional architecture is the notional one. Even if asking questions at the end of the tours visited (quiz) was appreciated as a striking element of the game (F), there was no lack of criticism on this. Some participants reported having perceived the final quizzes as quite superficial, not providing a wider or deeper evaluation of information gained playing the game:

"*The quiz after the tour felt gimmicky*". (C)
"[…] *Most of this information is related to Greek Names (also quizzes are related to these names). and I already forgot them.*" (K)
"*tour quizzes quite superficial (e.g. only asking about specific names of people and not larger understanding of the cultural events)*" (E)

4.2.3. Learning goals and teacher interventions

Another aspect underlined was the lack of specific learning goals and (challenging) tasks inherent in the game:

"*no learning goals beforehand, no direct aim (find some treasure or something)*" (K)
"[…] *game would need to be task and or goal oriented and i should be able to make my own choices of actions for example how i gather information. I should also be tested during the game so i could get feeling of accomplishment during the tasks.*" (D)
"*Lack of deeper engagement, lack of nuance*" (C)

Furthermore, the main risks of a receptive instruction modality are related to ignoring the attention span of learners, with the consequence of a possible cognitive overload and Long-Term Memory (LTM) encoding failures (Clark, 2000). Indeed, participant reported that: "[...] *at the end I felt cognitive overload as so many information (especially the tours with 11 pieces).*" (K), "[...] *without concrete learning goals and iteration (maybe with other educational techniques such as group discussion afterwards) the information gained in the game can be easily forgotten.*" (K). Therefore, it seems necessary not only to set specific learning goals within an educational path as the game itself is not oriented towards specific goals, but also to obtain the teachers' firm interventions (after or before game session) in relation to a proper evaluation of acquired information while playing the game. Another risk is that of being distracted by aesthetics elements: "*a lot of distractions*" (L), "*being distracted by the aesthetics, needs guidance by the educator to make sure people are actually processing the info shown*" (C), or by fun/gameplay: "*The important historical details of the world may get hidden behind the fun gameplay.*" (G), "[...] *children can use a lot of time in playing the game instead of learning the main concept.*" (L). The educator's monitoring is finally recognized as important in order to avoid students' addiction: "*Maybe if a child addicted to play these games it would not be good. Hope this should be controlled by an adult.*" (M).

In conclusion, the key-elements highlighted by participants appear to be: setting specific learning goals, in-depth testing of acquired information, teachers' intervention/dialogue with the student and the teacher's monitoring to avoid student distraction.

4.2.4. Active learning strategies

Whereas the game mainly follows this transmissive-instructional model, in order to balance the learning activity within the frame of the game's use in the classroom, it might be useful to accompany the game activity with active instructional strategies. Among the participants there are some who suggest active/simulative pedagogical solutions: "[...] *Here, I would draw from the game as ideas for roleplay, making or crafting things, or simulating ancient greek* [sic] *society*" (C), and those who suggest a contextual use with additional materials/concrete objects: "*The game still very much follows text-based knowledge transfer, and therefore requires contextualiyzation* [sic] *with additional materials, objects, and artifacts outside the game space.*" (H). Finally, it is reported that: "[...] *might be a good option for workshop-based/project-based learning experiences*" (H).

4.3. Theme 3: Perspective

4.3.1. Immersiveness and realism

In general, the environment is perceived as immersive, realistic and detailed. In particular, regarding realism, the "graphics" are recurrently highlighted (especially in question 1, Figure 2). Furthermore, some interesting observations are made:

"*Spectacular visuals, Interactive Surroundings, Immense music to focus, Clear Explanations, Even the accent of people is so realistic all of these are very Impressive for me*" (B)
"*the way that the characters talk to the player creates a sense of being talking to a human*" (A)

The "*realistic views*" (L) are considered among the striking aspects. With regard to the detailed and immersive world other striking aspects are mentioned: "*The detailed world.*" (G), "*It has plenty of details* [...]" (E), "[...] *I felt the atmosphere* [...]" (K). Furthermore, "*high amount of available information*" (H), "*immersed graphics (detailed)*" (K), "*immersiveness* [...] *simulation of nature and environments*" (C) are positive aspects perceived. Lastly, it is even reported:

"*Very immersive and impressive game engine, including graphics and audio. Detailed scenes, high quality textures, fun and immersive gameplay.*" (G)

To conclude, among the positive aspects about the game a participant mentioned: "*historical accuracy of pretty much everything that was presented*" (D).

4.3.2. Accuracy and representation

Although the game is generally perceived as realistic, detailed and immersive, some critical views were expressed about the representation of educational contents/material. Concerning the pedagogical dimension of the game some even reported that they think the game has a great potential and is much more profound, immersive and interesting than other traditional games, and affirmed:

"[…] *However, the company has a great responsibility on providing such information; how they represent certain events and characters, which perspectives they choose to highlight and other ethical considerations, so that they don't, for example, enforce stereotypes, racism or other unwanted values.*" (E)

Hence, when teaching with the game a certain degree of responsibility is necessary. Answering about the integration of the game in formal educational contexts for educational purposes:

"*Yes, I think it brings great depth to 'traditional' pedagogical contents, such as reading a book or filling out paper sheets. However, it is teacher's responsibility to discuss with students whether all the information presented in the game is correct. For example, I'm sure there's some technical things that restrict the game designers and e.g. the distances in the game are largely different from real life. Also some of the relationships between the characters may be made more dramatic than they actually were, and other things we do not exactly know from history.*" (E)

We must not forget that, after all, even if this game seems to have been created with great effort and attention in reconstructing historical/cultural materials, we are, however, dealing with a media product and we have to use this digital product as we do the other media (like movies, books, etc.). Indeed, considering that "[...] *we need to be careful of what kind of ethical or moral values such game represents, as it is a mix of entertainment and educational material. Also, not everything presented in the game may not be historically correct, so it is important to reflect and critically examine its contents.*" (E).

Thus, the teacher's intervention (which could be a simple de-briefing after the gaming activity) seems useful also for a critical discussion/reflection with students about the accuracy of the information acquired playing the game.

4.3.3. Changes

Some game changes in view of its use for learning are finally provided:

"[…] *i think there is huge potential on creating historically very accurate and interesting and immersive mini games that capture students to learning experience through gaming.*" (D)
"*Successfully getting full score in the quiz should give some unique rewards.*" (G)
"[…] *could have done minigames or interactive sequences to support the learning*" (C)

As we can see, in line with previous results, these suggestions are mostly about more interaction, the sense of accomplishment through rewards, and the creation of mini-games.

5. Discussion

In this section we summarize the main results of our thematic analysis according to the three generated themes and in relation to the research objectives (RO1, RO2).

5.1. RO1. Theme 1: Game as instructional resource

The following are the main points emerging from the analysis:

- It is shown how the game, in general, has a great pedagogical potential.
- Almost all the participants believe that the game can be integrated into formal educational contexts, and, in this regard, the majority reported that they would use it personally. The game appears suitable for formal educational contexts and for curricular use. The synergy of various factors primarily contributes to this feature: easy and accessible playability, the presence, variety and richness of educational content and materials, the detailed and immersive environment and the game's visual modality.
- Pedagogical solutions about game integration are provided, such as using the game title as a starting approach to the comprehension of Greek culture/history.
- The analysis seems to reveal the general perception of an overall significant advantage in using this game as a GBL tool compared to a "classic" educational approach in a variety of areas: motivation, learning, interest, engagement, attraction for uninspiring contents or for inattentive students and even in increasing accessibility for disadvantaged students with conventional methods.

5.2. RO1. Theme 2: Transmissive educational mode

The following are the main points emerging from the analysis:

- The analysis on participants' experience seems to confirm how the game follows a transmissive-receptive (and, to a lesser extent, exploratory) instructional model with tangible risks of cognitive overload or getting lost (being distracted) in playing the game.
- Several needs arise: setting specific learning goals within a precise educational path, the in-depth fact-checking of acquired information, teachers' intervention/dialogue with students, and teachers' monitoring to avoid distraction due to fun/gameplay or aesthetics.
- For a balanced learning experience, the analysis highlights that the integration/alternation of active methodologies with the use of the game in formal educational contexts is advisable.

Based on our results, overall, even following a mostly transmissive instructional mode, the game seems to have a good pedagogical potential (both in teaching and learning) and can be seen as an

instructional resource, especially for curricular use. In this, the easy playability, the variety and richness of (quite accurate) educational materials and the visual modality play a significant role.

5.3. RO2. Theme 3: Perspective

The following are the main points emerging from the analysis:

- The game environment is generally perceived as detailed, realistic and immersive.
- However, the teacher's responsibility in reflecting/discussing with students about accuracy of information acquired playing the game should not be overlooked. Therefore, when adopting this game in formal teaching, a discussion about information accuracy is advisable.
- Some game changes for fostering learning are suggested (adding mini-games, full score, unique rewards, etc.)

Based on the above results, there are some reasoned/critical perspectives on the use of this game in formal education in relation to information accuracy and representation of educational materials. The importance of the teacher's role in discussions with students is also recognized.

6. Conclusive remarks

Our research seems to confirm our previous exploratory study (Sardo & Thibault, 2024) in relation to the fact that the game follows a mainly instructional transmissive-receptive architecture and, to a minor extent, an exploratory type of instructional architecture. This should undoubtedly be taken into account if we are planning to use this (or a similar) game as a GBL tool. Convergent risks of both instructional architectures, even if they are different in nature, could be found in possible cognitive overload and in the need of previous domain knowledge. Then, as pointed out in our analysis, teachers' interventions (e.g., briefing, de-briefing actions and teachers' monitoring) are essential to avoid this, to ensure a holistic understanding of educational contents, and also to ensure students are processing information. Drawing inspiration from the experience of participants, one suggestion could therefore be to use the game after a short introductory briefing about the planned contents and then, after the gameplay activity, hold a de-briefing session (or group discussion) with the teacher in order to reflect on the topics covered. Still based on our results, another solution could be the use of the digital tool in combination with active strategies (to mitigate the mainly transmissive instructional approach of the game), in particular constructivist-simulative methodologies to foster a less notional and more *meaningful learning* (Ausubel, 1963) in order to make students develop *competences*, both curricular and transversal, beyond the acquisition of educational contents. In this regard, in planning educational activities, it is advisable to define and share with the learners a set of learning goals to be achieved through the educational path. These should be related to a precise evaluation rubric (set by the teacher), and to assessment instruments for evaluating knowledge acquisition/understanding/competences after the activity. Our study agrees with the study (based on the same game of this research) of Paananen and colleagues (2023) that highlighted the perceived need for more tasks, goals and interaction and pointed to "content" as a positively perceived element. Our results are also in line with Gilbert's, who conducted qualitative interviews with students after they had played an *Assassin's Creed* franchise game (Gilbert, 2019). In this study, students' perceptions revealed a more immediate access to History (and a more holistic view of it) compared to school-based education.

Still with regard to pedagogical considerations, of course a game like this can contribute to foster exploration. Some participants reported that they appreciated the amount of material available in the game and that this variety and richness of contents encourages exploration. We have to consider how this immersive and realistic world can have an impact on helping students to contribute to a deeper understanding in learning history and also to foster an exploratory learning strategy. Indeed, some of our informants reported that the learning-by-discovery mode within the game is interesting, and that they appreciated the freedom in exploration. Furthermore, some reported how this allows the user to control their own learning. The strong control (freedom) of the learner is in fact a characterizing factor of the exploratory architecture (Bonaiuti, 2014, Bonaiuti et al., 2016; Clark, 2000;).

Although this game does not seem to fall within the canonical classification of an "educational game", our findings seem to support what was stated in Guerra-Antequera and Revuelta-Domínguez (2022, p. 41) about the fact that in educational videogames the focus is more on the content, rather than on the ludic/gameplay aspects and that these educational games are based on linear teaching/learning models. The observations made by participants confirm the importance of teachers' roles in guiding students in the right direction and in de-briefing–(see, e.g., Egenfeldt-Nielsen, 2006, p. 205). Even if it is true that some effective learning principles are not in "educational games" (Gee, 2005), as is partially true in this game, we believe this title is a good compromise. It presents a certain affordability in educational terms: easy and accessible playability, richness of educational contents (which lend themselves to a curricular use), visuals in line with formal education (which could foster the learning process). As highlighted in our analysis, we cannot fail to take into account the positive general perception of pedagogical game potential and the overall educational advantage in the use of this game as a GBL tool compared to a traditional educational approach.

We point out the great immersivity of the game, its impressive graphics and detailed environment. These features might, perhaps to a minor extent, incentivize an exploratory learning attitude by stimulating curiosity and interest in exploring the environment. The game might therefore be used as a *discovery learning tool*.

We therefore consider the positive side of this game that meets the educational system constraints: firstly, the gameplay duration, as "commercial" games are often more complex and generally require much longer to master (see, e.g., Squire, 2005 about *Civilization III*) and this is true both for students and teachers. Furthermore, the PEGI classification, as many commercial games are not suitable for primary or secondary school as they are often 18+-classified and/or might include violent contents. Finally, the notorious "content issue", as it is very complex to link curricular contents/competences using commercial games. These educational settings limitations must be taken into account. It is not surprising that serious/educational games are most commonly found in educational contexts (Costa et al., 2016; Guerra-Antequera & Revuelta-Domínguez, 2022). We therefore believe that good pedagogical principles should be integrated by the teachers and that the key factor is how games are used in relation to educational strategies adopted by the teachers in the instructional design phase.

7. Limitations and future perspectives

Ultimately, we have implemented certain measures to ensure our research attains greater objectivity and transparency, such as a controlled environment (technological laboratory) for the game-experience, a systematic and analytic qualitative method for data analysis, and an additional two-way coding process. Despite this, it should be considered that our research is in any case qualita-

tive in nature and, by virtue of this, has several limitations. Firstly, the perspectives and personal background of the researchers who conducted the thematic analysis, as each thematic analysis is the result of a personal hermeneutic process. Moreover, the professional instrumentation used during the game activity – a high-performance PC connected to a 4k monitor with the game configuration settings at the highest level – could impact the gameplay experience, as well as influence the more than positive general perception about game graphics and, consequently, the feeling of immersivity of the game environment (although we believe that the game itself has a remarkable graphic compartment regardless of the different digital platforms used to play it). Notwithstanding this, we believe that our research could provide profitable guidance and useful practical pedagogical hints to those interested in using this game (or a similar one) as a GBL tool in educational contexts. More widely, it may provide suggestions and guidelines for the establishment of an *ex-ante* pedagogical design of game-based interventions and activities. Future research will follow this direction. We will analyse other typologies of (educational) videogames (such as strategy, action-adventure or God games) in relation to instructional design implementation, in order to provide a systematic guidance for an educational design of digital game-based interventions.

8. Author contributions

The article is the result of the joint effort of all authors. For the formal attribution, please consider sections 2, 3, 4, 5 and 6 as written by Michele Sardo and sections 1 and 7 by Mattia Thibault.

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